Amendments to the Specification:

Please amend the paragraph at page 1, lines 11-15 as follows:

This application is related to copending application serial number PCT/US00/25136 ~~"not yet assigned"~~, attorney docket number ~~0887-4147PC2~~ 15959, filed on the same date as this application, entitled "METHOD AND SYSTEM FOR IMAGING THE DYNAMICS OF SCATTERING MEDIUM" by inventor R. Barbour is hereby incorporated by reference (hereinafter the "Barbour 4147PC2 application"). The counterpart U.S. patent application is app. no. 10/088,190, filed March 14, 2002.

Please amend the paragraph at page 1, lines 16-20 as follows:

This application is related to copending application serial number PCT/US00/25157 ~~"not yet assigned"~~, attorney docket number ~~0887-4149PC1~~ 15965, filed on the same date as this application, entitled "METHOD AND SYSTEM FOR ENHANCED IMAGING OF A SCATTERING MEDIUM" by inventors R. Barbour and Y. Pei and is hereby incorporated by reference (hereinafter the "Barbour 4149PC1 application"). The counterpart U.S. patent application is app. no. 10/088,185, filed March 14, 2002.

Please amend the paragraph at page 1, lines 21-25 as follows:

This application is also related to copending application serial number PCT/US00/25156 ~~"not yet assigned"~~, attorney docket number ~~0887-4149PC2~~ 15966, filed on the same date as this application, entitled "IMAGING OF SCATTERING MEDIA USING RELATIVE DETECTOR VALUES" by inventor R. Barbour and is hereby incorporated by reference (hereinafter the "Barbour 4149PC2 application"). The counterpart U.S. patent application is app. no. 10/088,192, filed March 14, 2002.

Please amend the paragraph at page 2, lines 2-5 as follows:

The invention relates to a system and method for tomographic imaging of dynamic properties ~~in~~ of a scattering medium, which may have special application to medical imaging, and in particular to systems and methods for tomographic imaging using near infrared energy to image time variations in the optical properties of tissue.

Please amend the paragraph at page 3, lines 5-19 as follows:

However, cross-sectional or volumetric imaging of dynamic features in large tissue structures is not extractable with current optical imaging methods. At present, whereas a variety of methods involving imaging and non-imaging modalities are available for assessing specific features of the vasculature, none of these assess ~~measure~~ dynamic properties based on measures of hemoglobin states. For instance, detailed images of the vascular architecture involving larger vessels (> 1 mm dia.) can be provided using x-ray enhanced contrast imaging or MR angiography. These methods however are insensitive to hemoglobin states and only indirectly provide measures of altered blood flow. The latter is well accomplished, in the case of larger vessels, using Doppler ultrasound, and for near-surface microvessels by laser Doppler measurements, but each is insensitive to variations in tissue blood volume or blood oxygenation. Ultrasound measurements are also limited by their ability to penetrate bone. Other methods are available, (e.g., pulse volume recording, magnetic resonance (MR) BOLD method, radioscintigraphic methods), and each is able to sample, either directly or indirectly, only a portion of the indicated desired measures.

Please amend the paragraph at page 12, line 19 to page 13, line 10 as follows:

Referring again to FIG. 2, a system 200 includes an energy source, which in this implementation includes one or more laser 101. A reference detector 202 is used to monitor the actual output power of laser 101 and is coupled to a data acquisition unit 116. Such laser may be a laser diode in the NIR region. The laser is intensity modulated by a modulation means 203 for providing means of separation of background energy sources such as daylight. The modulation signal is also ~~send~~ sent to a phase shifter 204 whose purpose is described further below. The light energy generated by the laser 101 is directed into an optical de-multiplexing device 300 further discussed in detail below. Using a rotating mirror 305, the light is ~~being~~ directed into one of several optical source fiber bundles 306 that are used to deliver the optical energy to the medium 102. To provide good optical contact and measurement fidelity, one of several possible imaging heads 206 as described further below is used. A motor controller 201 is coupled to the de-multiplexing device 300 for controlling the motion of the rotating mirror 305. The motor controller 201 is also in communication with a timing control 104 for controlling the timing of the motion of mirror 305.

Please amend the paragraph at page 21, line 8 to page 22, line 2 as follows:

FIG. 8 shows the block diagram of one implementation of a detector channel. In this implementation, two energy sources are ~~being~~ used. After detecting the light at the optical input 801 by a photo detector 802 the signal is fed to a transimpedance amplifier 803. The transimpedance value of 803 is externally settable by means of digital signals 813 (PTA=Programmable Transimpedance Amplifier). This allows the adaptation to various signal levels thereby increasing the dynamic range of the detector channel. The signal is subsequently amplified by a Programmable Gain Amplifier (PGA} whose gain can be set externally by means of digital signals 814. This allows for additional gain for the lowest signal levels (e. g., in one implementation pW-nW) thereby ~~thereby~~ increasing the dynamic range of the detector channel.

Please amend the paragraph at page 22, lines 12 and 13 as follows:

In one embodiment, the signal 815 is sent to PGA 806,810 in parallel. In one embodiment, the signal 816 is sent to 807,811 in parallel.

Please amend the paragraph at page 22, lines 14-18 as follows:

As previously illustrated in FIG. 1, the analog signal provided by each of the channel outputs is sampled by a data acquisition system 116. In one embodiment, PC extension boards might be used for this purpose. PC extension boards also provide the digital outputs that control the timing of functions such as gain settings and sample-and-hold.

Please amend the paragraph at page 22, line 19 to page 23, line 11 as follows:

As previously noted, timing is crucial in order to provide the desired image capture rate and to avoid false readings due to detector-to-detector time skew. FIG. 9 shows one improvement of the invention over other timing schemes. With systems not comprising fast adaptable gain settings (such as some CCD based systems), a schedule according to 905 has to be implemented. The implementation in FIG 9 illustrates one use of a silicon photo-diode in process 904, which can be replaced by various detectors previously mentioned. A time series of data is acquired for a fixed source position. After finishing this task, the source is ~~being~~ moved 902 with respect to the target 901 and another series of data is ~~being~~ collected. Measurements are ~~being~~ performed in this fashion for all source positions. Every image 903 of the resulting time series of reconstructed images ~~are being~~ is reconstructed from data sets merged together from the data for each source position. This schedule does not allow real-time capture of all physiologic processes in the medium and therefore only applies to certain modes of investigation. Although we are aware of the use of such schemes, e.g., when monitoring responses on repeatable maneuvers, the timing scheme for the invention very much improves on this situation.

Please amend the paragraph at page 23, lines 12-19 as follows:

Because the invention allows for fast source switching and large dynamic range and high data acquisition rates, a schedule indicated by 904 is performed. Here, the source position is switched fast compared to the dynamic features of interest and instantaneous multi-channel detection is performed at each source position. Images 903 are then reconstructed from data sets, which represent an instant state of the dynamic properties of the medium. Only one time series of full data sets (i. e., all source positions and all detector positions) is being recorded. Real time measurement of fast dynamics (e. g., faster than 1 Hz) of the medium is provided by the invention.

Please amend the paragraph at page 23, line 20 to page 24, line 7 as follows:

FIG 10 shows one embodiment of a detailed schedule and sequence of the system tasks 1001 involved in collecting data at a source position and the proceeding of this process in time 1002. Task 1003 is the setting of the optical de-multiplexer to a destined source position and setting the detectors to the appropriate gain settings. The source position is illuminated for a period of time 1004, during which the lock-in amplifiers settle 1005. After the time it takes the S/H to sample the signal 1006, the signal is ~~being hold~~ held for a period of time 1007, during which all channels are ~~being~~ read ~~pout~~ out by the data acquisition. It is worthwhile noticing that during reading out the S/H, other tasks, like moving the optical source, setting the detector gains for the new source position, and settling of the lock-in, are being scheduled. This increases greatly the achievable data acquisition rate of the instrument.

Please amend the paragraph at page 26, lines 5-8 as follows:

In another implementation, the phase sensitive detection can be achieved with digital methods using digital signal processing (DSP) components and algorithms. The advantage of using DSP with the principles of the present invention is improved ~~lectronic~~ electronic performance and enhanced system flexibility.